

Remarks

Claims 62-82, 85-89 and 92-96 remain in the application. Claim 62 has been amended to adjust the fiber diameter and length with basis for these amendments found in the specification at page 1, last paragraph and page 3, lines 23-26. Claims 72 and 73 have been amended to describe "effective amount" as being to increase flame resistance with basis found at page 6, last paragraph. Claim 95 is amended by adding the word "and" to make the sentence correct.

The invention are nonwoven fibrous mats having a Taber stiffness of at least about 50, a smooth surface, an excellent and unexpected flame resistance, passing the National Fire Protection Association's (NFPA) Method #701 Flammability Test and a permeability in the range of about 500-800 CFM/sq. ft., and other requirements required for a facer for ceiling tiles of the type disclosed in the specification. As pointed out in the specification at page 2, lines 10-21, these mat properties are unique and unexpected in nonwoven mats containing a majority of glass fibers bound together with a particular type of organic binder having a molecular weight, of the polyacrylic acid homopolymer or copolymer, being about 3,000 or less. Such properties are very important to using non-woven mats on ceiling panels described in published U.S. Patent Application No. 20020020142 filed April 23,2001 and other specialty products. Exhibit 1, enclosed, shows the structure of the HunterDouglas Techstyle™ ceiling panel in which the claimed mat is used – the mats claimed herein is used as the connector or backer mat shown on this exhibit. This Exhibit was taken off of the internet at URL www1.hunterdouglascontract.com/HDWeb/Cultures/en-US/Products/Ceilings/AcousticalSolutions/ClassicSeries/Construction+Details.htm . This commercial product is very different in construction than prior art ceiling tiles and the properties of the claimed mats enable this type of construction for this very light weight, collapsible ceiling tile.

To achieve these properties the nonwoven fibrous mats contain about 65 to about 90 wt. percent glass fibers having a fiber diameter of 13 +/- 3 microns and a length in the range of about 0.55 - 1 inch, the fibers being bound together by about 15 to about 25 weight percent of the binder that is at least partially cured and comprises before drying and curing a homopolymer or a copolymer of polyacrylic acid and a polyol. Other claims such as 72-76

and 82 describe more particularly the embodiments described in Examples 3 and 4.

Claims 72 and 73 were rejected under 35 USC 112, second paragraph, as being indefinite because of the term "effective amount" – that term is urged to be "indefinite". The above amendment now describes effective amount as that to increase flame resistance as described in the last paragraph of page 6 of the spec. Applicants believe that the claims meet the requirements of 35 USC 112 and respectfully request the Examiner to withdraw this rejection and to allow all of the claims.

Claims 62-82, 85-89 and 92-95 were rejected under 35 USC 103 as being unpatentable over Kajander in view of Arkens et al '213. The Examiner stated that Kajander teaches nonwoven mats containing 25-75 wt. percent glass fibers bound together with 15-75 wt. percent of a resin binder, with the fibers having lengths in the range of 0.25 inch to about 1.25 inch and having a diameter of 1-23 microns and the major portion of the fibers having a diameter in the range of 8-16 microns, but teaching a formaldehyde containing binder. The Examiner also stated that Arkens et al teach a fiber glass nonwoven mat containing a type of binder of the type used in the invention and urges that it would have been obvious to have used the Arkens et al binder in the mats taught by Kajander instead of the binder taught by Kajander because both patents teach making nonwoven mats of fibers bound with a resin binder. This rejection is traversed because applicants believe that there is no motivation for using the binder of Arkens et al in the process of Kajander and in fact there are definite reasons why one of ordinary skill would not look to Arkens et al to improve the mats taught by Kajander. Applicants' own disclosure is the only reason why one would combine the teachings of Kajander and Arkens et al, and doing so for this reason is an improper hindsight reconstruction of applicants' invention.

The reasons why one of ordinary skill in the art would not look to Arkens et al to improve the mats taught by Kajander are as follows:

1. The two references address different and unrelated problems.

Kajander addresses the problem of getting a nonwoven fibrous mat to bond to

wood. Note that Kajander teaches in col. 1, lines 52-67, and particularly at lines 65-67, that fibrous nonwoven mats containing urea formaldehyde, usually modified with a plasticizing resin including an acrylic resin or melamine formaldehyde resins work well in many applications but do not provide the desired bonding strength to wood products. Kajander teaches using a different binder resin, an aqueous furfuryl alcohol based resin, phenol formaldehyde, melamine or mixtures of these resins, and then curing to only a B-stage prior to using the mat on wood, see col. 2, lines 11-17 and claim 1.

Arkens et al is not concerned with a fibrous nonwoven mat for bonding to wood products, but instead is concerned with making a new binder for bonding fibers together in a nonwoven mat for roofing products like shingles or roll roofing, see col. 1, lines 35-39 blanket, etc. that are heat resistant, i.e. will stand being contacted with hot asphalt at temperatures of 150-250 deg. C., see col 1, lines 39-42. Arkens et al are silent about bonding to wood, therefore one of ordinary skill in the art would not look to Arkens et al to make a mat suitable for bonding to wood, nor would they find anything in Arkens et al reasonably suggesting using the Arkens et al binder for making a fibrous nonwoven mat suitable for using in the collapsible ceiling tile disclosed in published U.S. Patent Application No. 20020020142 filed April 23, 2001.

2. Neither Kajander or Arkens et al teach or reasonably suggest the claimed mat.

The invention of claim 1 is a nonwoven fibrous mat having the following characteristics and properties:

Basis wt. 2-2.75 lbs/100 sq. ft. Claims 72-76 & 82 - 2.3 – 2.6 lbs/100 sq. ft.

Glass fibers – 65 – 90 wt. percent – Diameter of 11.5 – 16 microns

Fiber length – 0.55 – 1 inch

Binder - a homopolymer or a copolymer of polyacrylic acid and a polyol having a molecular weight of about 3000 or less,

average molecular weight of the polyacrylic acid homopolymer or copolymer being about 3,000 or less.

Binder content – 15-25 wt. percent.

Taber Stiffness – 50 plus

Air permeability – 500 – 800 CFM/sq. ft.

Flammability – Passes NFPA Method # 701

The invention of the dependent claims add further limitations having basis in the Examples 2-4 provided in the specification.

Kajander teaches fibrous nonwoven mats having

Only 25 to 75 wt. percent glass fibers with no suggestion of 65 wt. percent being a critical minimum, note that Examples 2 and 3 contained only 62.3 wt. percent fibers.

Kajander teaches that the binder content in the mats can be between 15 and 75 wt. percent, with no suggestion of a criticality of a maximum of 25% - Examples 2 and 3 contain more than 35 wt. percent binder.

Fiber diameters of preferably 8 to 16 microns with no suggestion of a critical minimum of 11.5 microns, and in col. 2, line 67 through col. 3, line 3, that up to 50 % of the fibers can have an average diameter of less than 1 micron. Also, two of the Examples used 10 micron diameter fiber.

Kajander fails to suggest any criticality of the basis weight, and the mats of the Examples have basis weights that range between 1.7 and 5.1 lbs/100 sq. ft.

Kajander was not concerned with the properties of air permeability in the range of 500-800 and Taber Stiffness of a critical minimum of 50, and common sense and knowledge of one of ordinary skill in the nonwoven art reveals that mats with binder contents in the upper range of Kajander would not have the claimed permeability of 500 –800 CFM/sq. ft., and that mats having up to 50 %, of the 66-75 wt. percent of fibers, having diameters of less than 1 or even 3 microns would not have a Taber stiffness of at least 50.

There is nothing in Kalander to lead one of ordinary skill to the presently claimed mats having properties essential to use in the compressible ceiling tile, and nothing to motivate one to make such a mat, nor is this deficiency eliminated by the teachings of Arkens.

Arkens et al fails to teach or reasonably suggest that their binders would effect the type of bond to wood products as the binders taught by Kajander. Further, Arkens et al fails to teach or reasonably suggest the critical feature about the fibers, nonwoven fibrous mats claimed or their properties, e.g. teaches a fiber length of 1.25 inches and a basis weight of 1.75 lbs./100 sq. ft. and 28 wt. percent binder in Example 3. Arkens et al does teach one of many different types of mat binders used in nonwoven fibrous mats, but fails to teach or reasonably suggest anything about the critical molecular weight limitation of the claimed invention, i.e. a molecular weight of about 3000 or less. The preferred molecular weight taught by Arkens et al is 10,000 to 100,000. Therefore, Arkens et al teaches away from the claimed invention. The reference to "with a molecular weight of less than about 1000" in col. 3, lines 49-50 refers only to the polyacid and not to the finished addition polymer binder, see col. 4, lines 1-29. Furthermore, Arkens et al is not concerned with nonwoven mats having the requisite properties for the compressible ceiling tile described above, but rather with "heat resistant products that will stand up to being impregnated with hot asphalt at 150-250 deg. C. in the manufacture of roofing and flooring products, see col.1, lines 35 – 55, and and products for applications other than compressible ceiling tile, see col. 8, lines 61-67.

There are hundreds of patents involving nonwoven fibrous mats. Just because both references involve nonwoven fibrous mat products, the ordinary artisan would not find it obvious to use his valuable time and resources to try every combination of every teaching of every patent that dealt with nonwoven fibrous mats – to do so he would need to find in the patent's teachings some information or suggestion that so motivated him to go to the trouble and expense of combining the teachings – that information or suggestion is completely lacking in this case. Also, there are a plethora of resins and binders that are and conceivably might be used to bond glass fibers together in a nonwoven mat, but it is was not obvious, when applicants set out to make a mat suitable for a facer mat for the special types of ceiling tiles as disclosed in U. S. Published Patent Application No. 20020020142, to have

selected all of the parameters found to be important, and critical, and that are recited in the present claims.

The Examiner urges that it is reasonable to presume that the properties of the claimed mats would be inherent to combinations of the teachings of Kajander and Arkens et al that would be obvious to one of ordinary skill in the art, i. e. those mats that the combinations of these teachings would lead the ordinary artisan to make. The error of this position is that it is not relevant because none of the references or any reasonable combination teaches or reasonably suggests the combination of limitations that constitutes the claimed mats. None of the examples of Kajander et al mats had the combinations of mat parameters of the invention of claim 1 or any of the other claims and therefore it is unreasonable to assume that the mats taught by Kajander inherently have the properties set forth in the present claims, particularly when it is known that basis wt., fiber content, fiber diameter and type of binder substantially influence these properties.

Applicants have shown above why the ordinary artisan would not be led to the claimed mats. The absence of any reasonable suggestion in Arkens et al that their binders would produce the same or similar results with wood products sought by Kajander would preclude the skilled artisan from using the Arkens et al binder in the process of Kajander and the preferred ranges of limitations in both these references would lead the ordinary artisan away from the claimed mats. For these reasons, it seems reasonable to conclude that this combination of patents is arranged only by hindsight reconstruction after having the benefit of applicants' disclosure, an improper basis for asserting obviousness, e.g. see "improper to use Applicants' own disclosure as a roadmap to piece bits and pieces of non-related patents together with hindsight reconstruction to reject the claims under 35 USC 103, see American Medical Systems, Inc. v. Medical Engineering Corp., 26 USPQ 2d 1081, 1091, 1992, or as an instruction manual or template to piece together teachings of prior art to render the claims obvious, see In re Fritch, 23 USPQ 2d 1780, 1783, 1992. Economy of production is as valid a basis for invention as foresight in disclosure of new means and an answer to a long felt want is a valid signpost of invention, see Kaynar Company et al v. The I. Leon Co., Inc., 128 USPQ 25, 27-28, 1960.

Without the teachings in applicants disclosure there would be no incentive or obvious reason to modify Kajander by removing binders that Kajander taught bonded good to both

glass fibers and to wood when cured to a B stage and to replace it/them with a binder taught by Arkens et al whose wood bonding qualities, in the presence of a major portion of glass fibers and in a B stage form the properties are unknown. Also, in addition to showing that some elements of applicants' invention are known, even as here, in a broad sense, the Examiner must still provide evidence of why it would be obvious for one of ordinary skill to combine the teachings together in the manner of the claimed invention to achieve applicants' claimed invention. It is not enough to merely show that both references relate to a common area of art, there must be a reasonable basis for holding it would have been obvious to one of ordinary skill to have modified the teachings of the two references to obtain the claimed invention.

For these reasons, applicants believe that all the claims are patentable under 35 USC 103 and respectfully request the Examiner to withdraw this rejection and to allow all of the claims.

Claims 62-71, 74-82, 85-89 and 92-96 were rejected under 35 USC 103 as being unpatentable over Jaffee et al in view of Arkens et al '213. The Examiner stated that Jaffee et al teaches nonwoven mats containing 70-85 wt. percent glass fibers at least 0.75 inch long bound together with 15-30 wt. percent of an acrylic copolymer resin binder, but not the type of binder used in the invention. The Examiner also stated that Arkens et al teaches a fiber glass nonwoven mat containing a type of binder of the type used in the invention and urges that it would have been obvious to have used the Arkens et al binder in the mats taught by Jaffee et al instead of the binder taught by Jaffee et al because both patents teach making nonwoven mats of fibers bound with a resin binder. This rejection is traversed because applicants believe that there is no motivation for using the binder of Arkens et al in the process or mats of Jaffee, and in fact there are definite reasons why one of ordinary skill would not look to Arkens et al to improve the mats taught by Jaffee. A reasonable combination of the teachings of Jaffee and Arkens et al, don't produce the claimed mats.

Jaffee teaches that prior art nonwoven mats did not provide the bonding strength, resistance to humidity, and low cost needed for an optimum nonwoven facer for bonding to foam, see col. 1, lines 16-53. Jaffee et al teach how to make nonwoven mats having a basis wt. of up to 1.9 lbs./100 sq. ft. that do bond well to foam, and the reason that they bond good

to foam is because of most of the fibers are in incompletely dispersed bundles in the mat, see col. 2, lines 31-34, and because of the acrylic resin, having a glass transition temperature exceeding 45 degrees C., is cured to only a "B" stage, see col. 3, lines 20-32 and col. 8, lines 11-15. Note that in col. 3, lines 23-24, Jaffee teaches that "the mat is softer and more flexible", evidence that the mat would not have a Taber Stiffness of at least 50.

Further, Arken et al do not teach or reasonably suggest that their binders bond well to foam, that their binders have a glass transition temperature exceeding 45 degrees C, or that they that if "B" staged that they would cause a nonwoven fiber glass mat to bond well to foam. With out such teachings there would be no incentive or obvious reason to modify Jaffee by removing binders that Jaffee taught bonded good to foam when cured to a B stage and replace it/them with a binder taught by Arkens et al whose glass transition temperature was unknown and whose foam bonding qualities or B stage properties were unknown. Still further, Jaffee does not teach or reasonably suggest the critical limitations of the claimed mats, nor their properties, and the teachings of Arken et al do not remedy this deficiency. This rejection seems to be an even better example of a hindsight reconstruction using applicants' own disclosure as a roadmap.

The Examiner urges that Jaffee does not teach a specific acrylic copolymer resin to use to make his mats. The Examiner's attention is directed to col. 4, lines 34+ where Jaffee sets forth the resin product and supplier that he prefers to use, including its Tg and also at least one less preferred, but suitable, resin product and its supplier and Tg. Both of these resin products have been available from B.F. Goodrich and a successor, Noveon, since the time the Jaffee patent was filed, and there would be no need for the ordinary artisan to look to Arken et al to improve Jaffee, or to use anything in Arken et al to try to improve the mats of Jaffee for bonding to foam. There are 100's of patents involving nonwoven fibrous mats. Just because both references involve nonwoven fibrous mat products, the ordinary artisan would not find it obvious to use his valuable time and resources to try every combination of every teaching of every patent that dealt with nonwoven fibrous mats – to do so he would need to find in the patent's teachings some information or suggestion that so motivated him to go to the trouble and expense of combining the teachings – that information or suggestion is completely lacking in this case. Also, in addition to showing that some elements of applicants' invention are known, even as here, in a broad sense, the Examiner must still provide evidence of why it would be obvious for one of ordinary skill to combine the

teachings together in the manner of the claimed invention to achieve applicants' claimed invention. It is not enough to merely show that both references relate to a common area of art, there must be a reasonable basis for holding it would have been obvious to one of ordinary skill to have modified the teachings of the two references to obtain the claimed invention. A Peterbuilt truck and a Mini-Cooper are both motor vehicles, but that is not enough to make it obvious to put a Peterbuilt transmission in a Mini-Cooper. There has to be a reasonable basis for why one of ordinary skill would want to combine the teachings of the references including a reasonable expectation of achieving the objective of the invention. Those critical elements of obviousness are not present with just the two references of Jaffee et al and Arkens et al.

The Examiner urges that the motivation to combine the teachings of Jaffee and Arkens et al is to use a binder free of formaldehyde, but the binders taught by Jaffee contain no formaldehyde.

Finally, claims 85-89, 91, 92, 94 and 95 require a hydrophilic material on at least a portion of the surface of the mat and the Examiner does not point out where this is taught or is obvious to one of ordinary skill in the art.

For these reasons, applicants believe that the above rejected claims are patentable under 35 USC 103 and respectfully request the Examiner to withdraw this rejection and to allow all of the claims.

Claims 72 and 73 stand rejected under 35 USC 103 as being unpatentable over Jaffee or Kajander in view of Arkens et al for the reasons given above in the rejections and further in view of Black. The Examiner urges that Black teaches compositions imparting flame retardant properties to fabrics from synthetic polymer fibers and teaches the use of cyclic organic phosphate for such purpose and that it would have been obvious to have used an organic phosphate as a flame retardant additive, motivated by the desire of providing the fibers with flame retardant properties. This rejection is respectfully traversed for the reasons given above and further because this is another example of an improper hindsight reconstruction of applicants' invention. Black does not involve a glass fiber nonwoven mat bonded with a resin binder or to a product having good bonding properties for wood or foam.

Instead, Black is working with woven fabrics of cellulosic and synthetic polymer fibers and does not involve interaction with just any heat curable resins, see lines 53-55 of page 3, or the effects of Black's compositions on the properties of fibrous mats depending upon such resins and their heat cured bonding for properties critical for use on either wood or foam bonding strength or on the properties necessary for use on the ceiling tiles disclosed herein. The Examiner seems to ignore the negative teachings in lines 53-55, and the chemistry of the binders taught by Kajander, Jaffee and Arkens et al as Black urges fluorocarbon resins and gives the reasons for doing so. For these reasons one of ordinary skill in the art would not look to, or find therein, Black a solution to the problem of finding a way to make a mat having the properties of the claimed mats of the invention, a suitable facer for the ceiling tiles. Applicants believe that these claims are patentable under 35 USC 103 and respectfully request the Examiner to withdraw this rejection and allow all of the claims.

Applicants believe that the claims are now in condition for allowance, but if the Examiner believes one or more issues still exist, to expedite disposal of this application the Examiner is respectfully invited to call Applicants' attorney at the number listed below to discuss the issue or issues and a way of removing.

Respectfully submitted,


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Construction Details

Exhibit

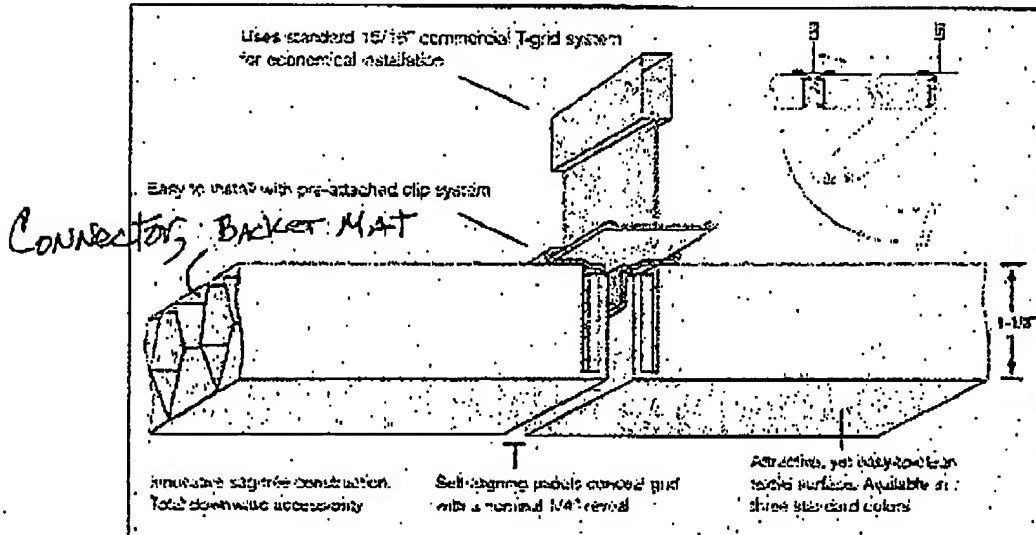
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HunterDouglasContractCeilings

Global > United States > Ceilings > Techstyle Acoustical Solutions > Classic Series

Construction Details

Techstyle Acoustical Ceilings Classic Series

**CHARACTERISTICS**

Substrate:	Acoustical mat
Surface finish:	Polyester Non-woven material
Panel Thickness:	1 1/8"
Panel Sizes:	24"x24" 30"x30" 48"x 48" 24"x48" 30"x60" 48"x 60" 24"x80" 48"x 72" 24"x72"
Material/sqm:	Approx 1/4 lb / SF
Light Reflectance:	LR-1 (77%) (ASTM E 1477) (White only)
Weight of Panel:	0.30 pounds per square foot

- Clean, Drywall-like Appearance
- Large panel sizes
- Outstanding acoustical performance
- Easy downward accessibility
- Narrow 1/4" reveal
- Economical installation on standard 15/16" T-grid
- Innovative sag-free construction
- Accommodates standard fixtures